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ABSTRAK

Adji Putra Abriantoro. **KAJIAN PENGARUH *FLY ASH* SEBAGAI BAHAN SUBSTITUSI SEMEN TERHADAP DURASI *INITIAL SETTING TIME*, *FLOWABILITY* DAN KUAT TEKAN UMUR 1 HARI BETON *SELF-COMPACTING CONCRETE* (SCC) DENGAN PENAMBAHAN 0,15% *CITRIC ACID* SEBAGAI *RETARDER* UNTUK SUPLEMEN BAHAN AJAR MATA KULIAH TEKNOLOGI BETON.** Skripsi, Fakultas Keguruan dan Ilmu Pendidikan Universitas Sebelas Maret Surakarta, Maret 2019.

Tujuan penelitian adalah, (1) mengetahui pengaruh *fly ash* sebagai bahan substitusi semen pada beton SCC dengan penambahan *citric acid* 0,15% sebagai retarder terhadap kuat tekan beton umur 1 hari, (2) mengetahui pengaruh *fly ash* sebagai bahan substitusi semen pada beton SCC dengan penambahan *citric acid* 0,15% sebagai retarder terhadap *flowability* beton segar, (3) mengetahui pengaruh *fly ash* sebagai bahan substitusi semen pada beton SCC dengan penambahan *citric acid* 0,15% sebagai retarder terhadap durasi *initial setting time*, (4) menghasilkan suplemen bahan ajar untuk mata kuliah Teknologi Beton tentang pengaruh *fly ash* sebagai substitusi semen terhadap *initial setting time, flowability*, dan kuat tekan umur 1 hari beton SCC dengan penambahan 0,15% *citric acid* sebagai *retarder*.

Penelitian ini menggunakan metode kuantitatif eksperimen dan teknik analisa data menggunakan analisis regresi sederhana. Variabel yang mempengaruhi dalam penelitian adalah (1) variabel terikat: *initial setting time, flowability,* dan kuat tekan umur 1 hari (2) varibel bebas: variasi persentase *fly ash* sebesar 0%, 15%, 25% dan 35%. Untuk jumlah sampel yang digunakan berjumlah 3 buah dari masing-masing variasi dengan rincian 15 buah untuk uji tekan beton umur 1 hari, 15 buah untuk uji *flowability,* dan 15 buah untuk uji *initial setting time* jadi total dalam penelitian ini menggunakan 45 benda uji.

Berdasarkan hasil penelitian disimpulkan bahwa, (1) perngaruh bertambahnya persentase *fly ash* maka kuat tekan yang dihasilkan akan semakin menurun, namun untuk variasi 0%,15% dan 25% hasil kuat tekannya telah mencapai 16% dari kuat tekan karakteristik K-850 pada umur 1 hari, (2) pengaruh bertambahnya persentase *fly ash* maka *flowability* semakin meningkat dengan *slump flow* tertinggi pada persentase *fly ash* 35% dengan diameter alir sebesar789 mm, dari ke lima variasi benda uji semua benda uji dinyatakan memenuhi standar ACI No.237R-07 untuk kriteria beton SCC, (3) pengaruh bertambahnya persentase *fly ash* maka *initial setting time* yang terjadi akan semakin melambat dengan durasi terlama yakni mencapai 140 menit pada persentase *fly ash* 35%, (4) bahan ajar yang dihasilkan berupa suplemen bahan ajar mata kuliah Teknologi Beton tentang pengaruh *fly ash* sebagai substitusi semen terhadap *initial setting time, flowability,* dan kuat tekan umur 1 hari beton SCC dengan penambahan 0,15% *citric acid* sebagai *retarder*.

Kata Kunci: beton SCC, *fly ash, flowability, initial setting time*, kuat tekan 1 hari

ABSTRACT

Adji Putra Abriantoro. **THE INFLUENCE STUDY OF FLY ASH AS A CEMENT SUBSTITUTION MATERIAL TO INITIAL SETTING TIME, FLOWABILITY AND 1 DAY AGE COMPRESSIVE STRENGTH OF SELF-COMPACTING CONCRETE (SCC) WITH ADDITION 0,15% CITRIC ACID AS RETARDER FOR SUPPLEMENT COURSE MATERIALS OF CONCRETE TECHNOLOGY**. Thesis, Teacher Training and Education Faculty, Sebelas Maret University, Surakarta, March 2019.

The research purposes were, (1) to investigate how the effect of fly ash as a cement substitutiton on SCC with the addition of citric acid 0,15% as a retarder for 1 day age concrete compressive strength (2) to investigate how the effect of fly ash as cement substitution on SCC with addition citric acid 0,15% as a retarder for the flowability of fresh concrete, (3) to investigate how the effect of fly ash as cement substitution on SCC with the addition of 0,15% citric acid as a retarder to the duration of initial setting time, (4) produce a teaching supplement course materials of Concrete Technology about the effect of fly ash as cement substitution on initial setting time, flowability, and 1 day age of Self-Compacting Concrete compressive strength by adding 0.15% citric acid as a retarder.

This study using an experimental quantitative methods and data analysis techniques using simple regression analysis. The variables that influence the research were (1) dependent variable: initial setting time, flowability, and 1 day age compressive strength (2) independent variable: variation in the percentage of fly ash by 0%, 15%, 25% and 35%. The samples used amounted to 3 pieces from each variation with details of 15 pieces for 1 day age compressive strength concrete test, 15 pieces for the flowability test, and 15 pieces for the initial setting time test, so in this research used 45 test items.

Based on the research results that were concluded that, (1) the increasing percentage effect of fly ash, so the result of compressive strength will decrease, but for variations of 0%, 15% and 25% the compressive strength had reached 16% of the compressive strength characteristic of K-850 at the 1 day age, (2) the increasing percentage effect of fly ash, so the result of flowability an increases with the highest slump flow at the percentage of 35% fly ash with a flow diameter of 789 mm, from the five variations of test specimens all tested specimens which fulfilled ACI No.237R-07 standard for SCC criteria, (3) the increasing percentage effect of fly ash, so the result of initial setting time that will be slow down with the longest duration of reaching 140 minutes at the percentage of 35% fly ash, (4) the teaching materials produced for Concrete Technology about the effect of fly ash as cement substitution on initial setting time, flowability, and 1 day age concrete compressive strength with the addition of 0.15% citric acid as a retarder.

Keywords: **Concrete, Fly Ash, Flowability, Initial Setting Time, 1 Day Age Compressive Strength**